NAEP 2005 Science Report for South Dakota

This report provides selected results from the National Assessment of Educational Progress (NAEP) for South Dakota's public school students at grade 4. Starting in 1996, science has been assessed in three different years at the state level (at grade 8 in 1996, and at both grades 4 and 8 in 2000 and 2005).

In the 2005 assessment, 45 jurisdictions participated: 44 states and the Department of Defense Education Activity Schools (domestic and overseas). South Dakota participated and met the criteria for reporting public school results.

NAEP is a project of the National Center for Education Statistics (NCES). For more information about the assessment, see *The Nation's Report Card, Science 2005,* which is available on the NAEP website along with the full set of national and state results in an interactive database (http://nces.ed.gov/nationsreportcard/). Released test questions, scoring guides, and question-level performance data are also available on the website.

K E Y F I N D I N G S F O R 2 0 0 5

Grade 4:

- South Dakota's average score (158) was higher than that of the nation's public schools (149).
- In South Dakota, the percentage of students (35 percent) who performed at or above *Proficient* was greater than that for the nation's public schools (27 percent).
- In South Dakota, the percentage of students (79 percent) who performed at or above *Basic* was greater than that for the nation's public schools (66 percent).

Introduction

What Was Assessed?

The content for each NAEP assessment is determined by the National Assessment Governing Board (NAGB). The objectives for each NAEP assessment are described in a "framework," a document that delineates the important content and process areas to be measured, as well as the types of questions to be included in the assessment.

The *Science Framework for the 2005 National Assessment of Educational Progress* guided the 2005 assessment. The same framework was used by NAGB for the 1996 and 2000 science assessments. The 2005 framework document can be accessed at the NAGB website at http://www.nagb.org/pubs/s_framework_05/761907-ScienceFramework.pdf.

The science framework is organized along two major dimensions: Fields of Science, including Earth, physical and life sciences; and Knowing and Doing Science, including conceptual understanding, scientific investigation, and practical reasoning. Each assessment question is categorized as primarily measuring one of the elements of knowing and doing within one of the fields of science.

To ensure that the NAEP assessment integrates the three fields of Science rather than simply assessing three separate content areas, the framework specifies two overarching domains that describe science: the *nature of science* and *themes.* The nature of science incorporates the historical development of science and technology, the habits of mind that characterize these fields, and methods of inquiry and problem-solving. It also encompasses the nature of technology. Themes are the "big ideas" that transcend the various scientific disciplines, and include systems, models and patterns of change. The overarching domains pertain to a subset of questions within the assessment.

A combination of multiple-choice and constructed-response questions was used to assess students' knowledge of important facts and concepts and to probe their analytical and problem solving skills. Constructed-response questions ask students to explain, apply, design, and communicate scientific information. In addition, about half of the students assessed were administered a hands-on task that probes students' abilities to use materials to perform investigations, evaluate experimental results, and apply problem-solving skills. The same series of test booklets was used in both the national and the state assessments. Each student receives only a portion of the assessment, consisting of a booklet containing two 25-minute sections of science questions. Released test questions, along with student performance data by state, are available on the NAEP website (http://nces.ed.gov/nationsreportcard/itmrls/).

Who Was Assessed?

Forty-five jurisdictions participated in the voluntary NAEP science assessment in 2005: This number included 44 states and the Department of Defense Education Activity Schools (domestic and overseas). The District of Columbia, normally a part of NAEP state assessments, did not participate in the science assessment because the mandatory reading and mathematics samples did not allow sufficient student samples for the third subject. The target sample for each state or other jurisdiction was approximately 100 schools at each grade tested and approximately 3,000 students for each subject at each grade, except in small or sparsely populated jurisdictions.

The sample of schools and students was chosen in a two-stage sampling process. First, the sample of schools was selected by probability sampling methods. Then, within the participating schools, random samples of students were chosen.

Beginning with the NAEP reading and writing assessments in 2002, the national sample was obtained by aggregating the samples from each state. The national results for science in 2005 include the results from the states and from a sample of private schools, weighted appropriately to represent the U.S. student population. Only public schools, however, are included in the state reports. State results are compared to national results for public school students within the report tables.

The NAEP state assessment in science was first administered to public school students at grade 8 in 1996 and was expanded to include students at grade 4 as well as grade 8 in 2000 and again in 2005.

The overall participation rates for schools and students must meet guidelines established by the National Center for Education Statistics (NCES) and the National Assessment Governing Board (NAGB) in order for assessment results to be reported publicly. Participation rates for the original sample needed to be at least 85 percent for schools in each grade.

Participation rates for the 2005 science assessment are available at the NAEP website (http://nces.ed.gov/nationsreportcard/science/sampledesign.asp).

How Is Student Science Performance Reported?

The results of student performance on the NAEP assessments are reported for various groups of students (e.g., fourth-grade female students, eighth-grade Hispanic students, or students who took the assessment in a particular year). NAEP does not produce scores for individual students, nor does it report scores for schools or for school districts. Some large urban districts, however, have voluntarily participated in the assessment on a trial basis and were sampled as states were sampled. Science performance for groups of students is reported in two ways: as average scale scores and as achievement levels.

Scale Scores: Student performance is reported as an average score based on the NAEP science scale, which ranges from 0 to 300 and is linked to the corresponding scales in 1996 and 2000. Subscales were created to reflect performance on each of the three content areas defined in the NAEP science framework.

An overall composite scale was developed by weighting each of the science subscales (Earth, physical, and life) for the grade based on its relative importance in the framework. This composite scale is the metric used to present the average scale scores and selected percentiles used in NAEP reports. While the numeric scale score ranges are identical for each grade, the scales were derived independently for each grade. Therefore, scale scores across grades cannot be compared.

Achievement Levels: Student performance is also reported in terms of three achievement levels—*Basic, Proficient*, and *Advanced*. Results based on achievement levels are expressed in terms of the percentage of students who attained each level. The three achievement levels are defined as follows:

- *Basic*: This level denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade.
- *Proficient*: This level represents solid academic performance for each grade assessed. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter.
- *Advanced*: This level signifies superior performance.

The achievement levels are cumulative. Therefore, students performing at the *Proficient* level also display the competencies associated with the *Basic* level, and students at the *Advanced* level demonstrate the competencies associated with both the *Basic* and the *Proficient* levels.

The achievement levels are performance standards adopted by the National Assessment Governing Board (NAGB) as part of its statutory responsibilities mandated by Congress. The levels represent collective judgments of what students should know and be able to do for each grade tested. They are based on recommendations made by broadly representative panels of classroom teachers, education specialists, and members of the general public from throughout the United States. As provided by law, the National Center for Education Statistics (NCES), upon review of congressionally mandated evaluations of NAEP, has determined that the achievement levels are to be used on a trial basis until it is determined that they are "reasonable, valid, and informative to the public" (No Child Left Behind Act of 2001, P.L., 107-110, 115 Stat.1425 [2002]). However, both NCES and NAGB believe these performance standards are useful for understanding trends in student achievement. They have been widely used by national and state officials as a common yardstick for academic performance. The science achievement-level descriptions are summarized in figure 1.

Figure 1-A	The Nation's Report Card 2005 State Assessment
	Descriptions of NAEP science achievement levels, grade 4

Basic Level (138)	Students performing at the *Basic* level demonstrate some of the knowledge and reasoning required for understanding the Earth, physical, and life sciences at a level appropriate to grade 4. For example, they can carry out simple investigations and read uncomplicated graphs and diagrams. Students at this level also show a beginning understanding of classification, simple relationships, and energy.

Fourth-grade students performing at the *Basic* level are able to follow simple procedures, manipulate simple materials, make observations, and record data. They are able to read simple graphs and diagrams and draw reasonable but limited conclusions based on data provided to them. These students can recognize appropriate experimental designs, although they are unable to justify their decisions.

When presented with diagrams, students at this level can identify seasons; distinguish between day and night; and place the position of the Earth, Sun, and planets. They are able to recognize major energy sources and simple energy changes. In addition, they show an understanding of the relationship between sound and vibrations. These students are able to identify organisms by physical characteristics and group organisms with similar physical features. They can also describe simple relationships among structure, function, habitat, life cycles, and different organisms.

Proficient Level (170)	Students performing at the *Proficient* level demonstrate the knowledge and reasoning required for understanding the Earth, physical, and life sciences at a level appropriate to grade 4. For example, they understand concepts relating to the Earth's features, physical properties, structure, and function. In addition, students can formulate solutions to familiar problems as well as show a beginning awareness of issues associated with technology.

Fourth-grade students performing at the *Proficient* level are able to provide an explanation of day and night when given a diagram. They can recognize major features of the Earth's surface and the impact of natural forces. They are also able to recognize water in its various forms in the water cycle and can suggest ways to conserve it. These students recognize that various materials possess different properties that make them useful. Students at this level are able to explain how structure and function help living things survive. They have a beginning awareness of the benefits and challenges associated with technology and recognize some human effects on the environment. They can also make straightforward predictions and justify their position.

Advanced Level (205)	Students performing at the *Advanced* level demonstrate a solid understanding of the Earth, physical, and life sciences as well as the ability to apply their understanding to practical situations at a level appropriate to grade 4. For example, they can perform and critique simple investigations, make connections from one or more of the sciences to predict or conclude, and apply fundamental concepts to practical applications.

Fourth-grade students performing at the Advanced level are able to combine information, data, and knowledge from one or more of the sciences to reach a conclusion or to make a valid prediction. They can also recognize, design, and explain simple experimental procedures.

Students at this level recognize nonrenewable sources of energy. They also recognize that light and sound travel at different speeds. These students understand some principles of ecology and are able to compare and contrast life cycles of various common organisms. In addition, they have a developmental awareness of the benefits and challenges associated with technology.

NOTE: The scores in parentheses indicate the cut point on the scale at which the achievement-level range begins.
SOURCE: National Assessment Governing Board. (2004). *Science Framework for the 2005 National Assessment of Educational Progress.* Washington, DC: Author.

Assessing Students With Disabilities (SD) and/or English Language Learners (ELL)

The results displayed in this report and official publications of NAEP 2005 results are based on representative samples that include students with disabilities (SD) and students who are English language learners (ELL). Some of these students were assessed using accommodations (such as extra time and testing in small groups). In state NAEP science assessments prior to 2000, no testing accommodations or adaptations were permitted for students with disabilities and students who were English language learners. However, research carried out by NAEP showed that the results for students who were accommodated could be combined with the results for unaccommodated students without compromising the validity of the NAEP scales in trend comparisons. Therefore, the students who were identified as SD or ELL and typically received accommodations in their classroom testing, and who required these accommodations to participate, also received them in the NAEP assessment, provided the accommodations did not change the nature of what was tested.

Students who had an Individualized Education Program (IEP) or were protected under Section 504 of the Rehabilitation Act of 1973 were to be included in the NAEP assessment except when

- the school's IEP team determined that the student's cognitive functioning was so severely impaired that she or he could not participate;
- the student's IEP required that the student had to be tested with an accommodation or adaptation that NAEP does not allow, and the student could not demonstrate his or her knowledge without that accommodation.

All ELL students who received academic instruction in English for three years or more were to be included in the assessment. Those ELL students who received instruction in English for less than three years were to be included unless school staff judged them to be incapable of participating in the assessment in English.

In 2000, NAEP was administered using a split sample of schools—one sample in which accommodations were permitted for special-needs students who normally received them and another sample in which accommodations were not permitted. Therefore, there were two different sets of results available for 2000. The results for both samples are shown in the tables in this report. Results for the assessment year where accommodations were not permitted in state NAEP assessments (1996) are reported in the same tables as the results where accommodations were permitted (2000 and 2005).

Cautions in Interpreting Results

The averages and percentages in this report are estimates based on samples of students rather than on entire populations. Moreover, the collection of questions used at each grade level is only a sample of the many questions that could have been asked to assess the skills and abilities described in the NAEP framework. Therefore, the results are subject to a measure of uncertainty, reflected in the standard error of the estimates—a range of up to a few points above or below the score or percentage—which takes into account potential score fluctuation due to sampling error and measurement error. Statistical tests that factor in these standard errors are used to determine whether the differences between average scores or percentages are significant. All differences were tested for statistical significance at the .05 level.

NAEP sample sizes have increased since 2002 compared to previous years, resulting in smaller standard errors. As a consequence, smaller differences are detected as statistically significant than in previous assessments. In addition, estimates based on smaller groups are likely to have relatively large standard errors. As a consequence, some seemingly large differences may not be statistically significant. That is, it cannot be determined whether these differences are due to the particular makeup of the samples of students who were selected, or to true differences in the performance of the population of interest. The standard errors for the data in the tables of this report can be accessed online in the NAEP Data Explorer at (http://nces.ed.gov/nationsreportcard/nde/).

Differences between scores or between percentages are discussed in this report only when they are significant from a statistical perspective. Statistically significant differences are referred to as "significant differences" or "significantly different." Significant differences between 2005 and prior assessments are marked with a notation (*) in the tables. Any differences in scores within a year or across years that are mentioned in the text as "higher," "lower," "greater," or "smaller" are statistically significant.

It is important to note that simple cross-tabulations of a variable with measures of educational achievement, like the ones presented in this report, cannot constitute proof that a difference in the variable causes differences in educational achievement. There might be several reasons why the performance of one group of students might differ from another. Only through controlled experiments with random assignment of students to groups can hypotheses about the causes of performance differences be tested.

NAEP 2005 Science Overall Scale Score and Achievement-Level Results for Public School Students

Overall Scale Score Results

In this section student performance is reported as an average score based on the NAEP science scale, which ranges from 0 to 300. Scores on this scale are comparable from 1996 through 2005. Scales are created separately for each grade. Therefore, the scores across grades cannot be compared.

Prior to 2000, testing accommodations were not provided for students with special needs in NAEP state science assessments. For 2000, results are displayed for both the sample in which accommodations were permitted and the sample in which they were not permitted. Subsequent assessment results were based on the more inclusive samples. In the text of this report, comparisons to 2000 results refer only to the sample in which accommodations were permitted.

Table 1 shows the overall performance results of grade 4 public school students in South Dakota, the nation (public), and the region. The list of states making up a given region for NAEP prior to 2003 differed from the list used by the U.S. Census Bureau which has been used in NAEP from 2003 onward. Therefore, the data for the state's region are given only for 2005. A list of states comprising each region can be found online at http://nces.ed.gov/nationsreportcard/science/interpret-results.asp.

The first column of results presents the average score on the NAEP science scale. The remaining columns show the scores at selected percentiles. A percentile indicates the percentage of students whose scores fell at or below a particular score. For example, the 25th percentile demarks the cut point for the lowest 25 percent of students within the distribution of scale scores. The scale score given is the score for students at the given percentile, not the average score for students within a percentile range.

Grade 4 Scale Score Results

- In 2005, the average scale score for students in South Dakota was 158. This was higher than that for students across the nation (149).

Table 1 **The Nation's Report Card 2005 State Assessment**

Average science scale scores and selected percentiles, grade 4 public schools: 2005

Year and jurisdiction		Average scale score	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
2005	Nation (public)	149*	107*	129*	152*	172*	188*
	Midwest[2]	153	113	134	156	175	190
	South Dakota	158	123	142	160	177	190

* Value is significantly different from the value for South Dakota.

[2] The four regions defined by the U.S. Census Bureau are Northeast, South, Midwest, and West.

NOTE: The NAEP grade 4 science scale ranges from 0 to 300. All differences were tested for statistical significance at the .05 level using unrounded numbers. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Overall Achievement-Level Results

In this section student performance is reported as the percentage of students performing relative to performance standards set by the National Assessment Governing Board (NAGB). These performance standards for what students should know and be able to do were based on the recommendations of broadly representative panels of educators and members of the public.

In 2000 only, results were obtained for two student samples: one for which accommodations were permitted and one for which accommodations were not permitted. However, in the text of this report, comparisons to 2000 results refer only to the sample in which accommodations were permitted.

Table 2 presents the percentage of students at grade 4 who performed below *Basic*, at or above *Basic*, at or above *Proficient*, and at the *Advanced* level. Because the percentages are cumulative from *Basic* to *Proficient* to *Advanced*, they sum to more than 100 percent. Only the percentage of students performing at or above *Basic* (which includes the students at *Proficient* and *Advanced)* plus the students below *Basic* will sum to 100 percent (except for rounding).

Grade 4 Achievement-Level Results

- In 2005, 35 percent of South Dakota's students performed at or above *Proficient*. This was greater than the percentage of the nation's public school students who performed at or above *Proficient* (27 percent).

Table 2 **The Nation's Report Card 2005 State Assessment**

Percentage of students at or above science achievement levels, grade 4 public schools: 2005

Year and jurisdiction		Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
2005	Nation (public)	34*	66*	27*	2
	Midwest[2]	29	71	31	3
	South Dakota	21	79	35	2

* Value is significantly different from the value for South Dakota.

[2] The four regions defined by the U.S. Census Bureau are Northeast, South, Midwest, and West.

NOTE: Achievement levels correspond to the following points on the NAEP science scale: below *Basic*, 137 or lower; *Basic*, 138–169; *Proficient*, 170–204; and *Advanced*, 205 and above. All differences were tested for statistical significance at the .05 level using unrounded numbers. Detail may not sum to totals because of rounding. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Comparisons Between South Dakota, the Nation, and Other Participating States and Jurisdictions

Forty-five jurisdictions participated in the science assessment in 2005. These include 44 states and the Department of Defense Education Activity (DoDEA) schools (domestic and overseas). Previous NAEP reports presented results for the Department of Defense Dependents Schools (DoDDS) overseas and the Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS) in the United States separately. Data for the two jurisdictions in prior years have been retroactively combined to provide comparable data for the single DoDEA jurisdiction.

Comparisons by Average Scale Scores

Figures 2 compares South Dakota's 2005 overall science scale scores at grade 4 with those of public schools in the nation and all other participating states and jurisdictions. The different shadings indicate whether the average score of the nation (public), a state, or a jurisdiction was found to be higher than, lower than, or not significantly different from that of South Dakota in the NAEP 2005 science assessment.

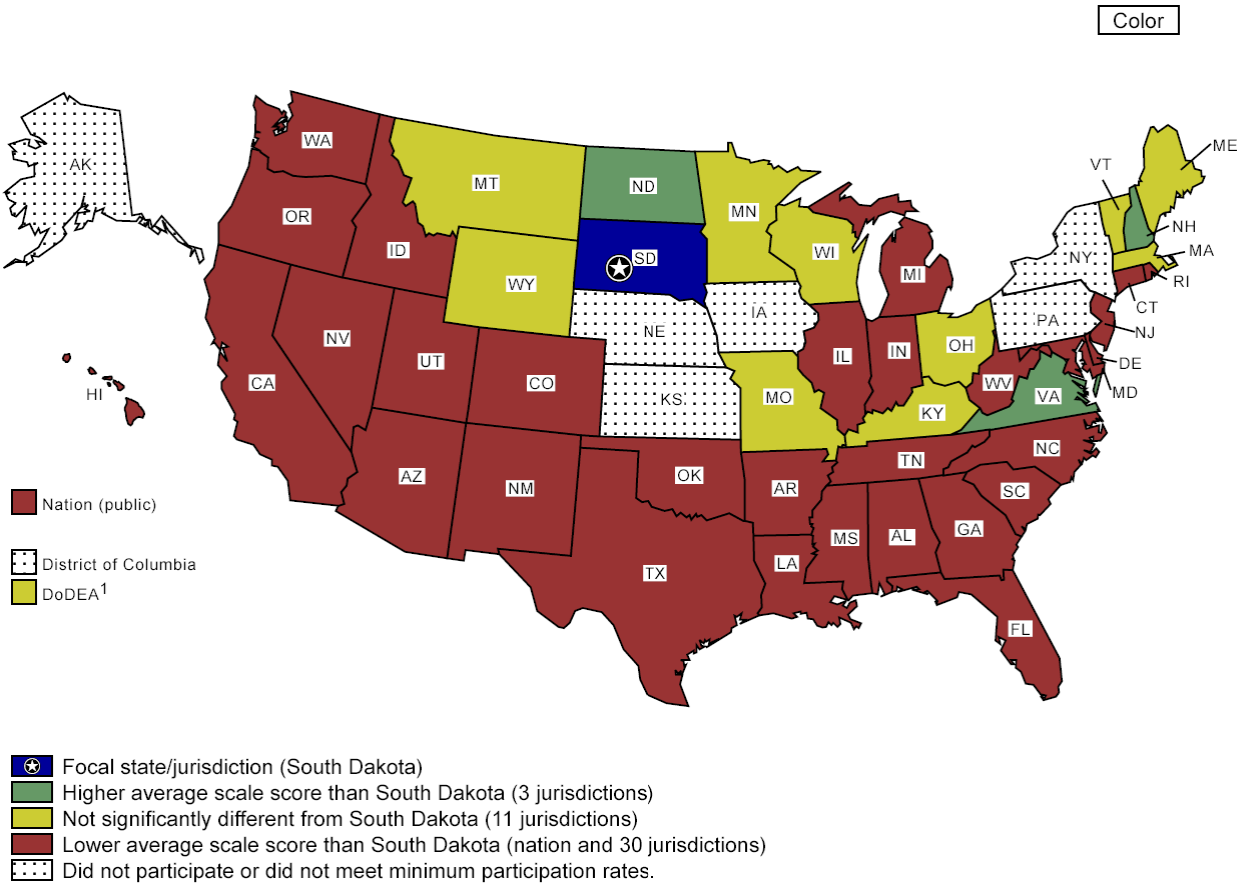
Grade 4 Scale Score Comparisons Results

- Students' average score in South Dakota was higher than the scores in 30 jurisdictions, not significantly different from those in 11 jurisdictions, and lower than those in 3 jurisdictions.

Figure 2

The Nation's Report Card 2005 State Assessment

South Dakota's average science scale score compared with scores for the nation and other participating jurisdictions, grade 4 public schools: 2005



Focal state/jurisdiction (South Dakota)
Higher average scale score than South Dakota (3 jurisdictions)
Not significantly different from South Dakota (11 jurisdictions)
Lower average scale score than South Dakota (nation and 30 jurisdictions)
Did not participate or did not meet minimum participation rates.

[1] Department of Defense Education Activity schools (domestic and overseas).

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

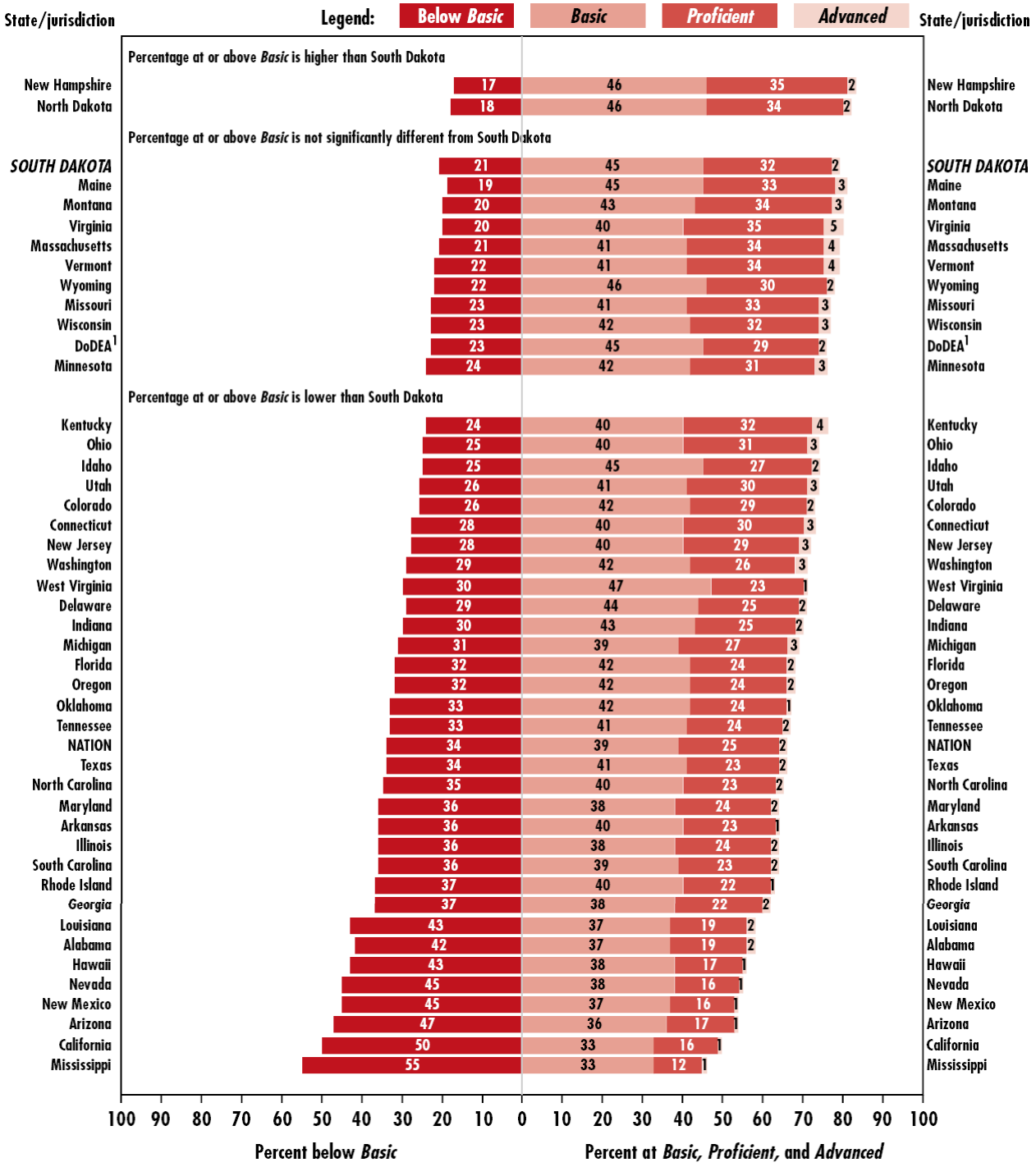
Comparisons by Achievement Levels

Figures 3 permits comparisons of all jurisdictions participating in the NAEP 2005 science assessment in terms of percentages of grade 4 students performing at or above *Basic*. The participating states and jurisdictions are grouped into categories reflecting whether the percentage of their students performing at or above (including *Proficient* and *Advanced*) was found to be higher than, not significantly different from, or lower than the percentage in South Dakota. The states and the nation are ordered by the percentage of students performing at or above *Basic* within each of the three comparison categories.

The Nation's Report Card 2005 State Assessment

Figure 3

Percentage of students within each science achievement level, and South Dakota's percentage at or above *Basic* compared with other participating jurisdictions, grade 4 public schools: By state, 2005



[1] Department of Defense Education Activity schools (domestic and overseas).
NOTE: The bars above contain percentages of students in each NAEP science achievement level. Achievement levels corresponding to each population of students are aligned at the point where the *Basic* category begins, so that they may be compared at *Basic* and above. Detail may not sum to totals because of rounding. The shaded bars are graphed using unrounded numbers. Significance tests used a multiple-comparison procedure based on all jurisdictions that participated.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Science Performance of Selected Student Groups

This section of the report presents trend results for students in South Dakota and the nation by demographic characteristics. Student performance data are reported for

- gender
- race/ethnicity
- student eligibility for free/reduced-price school lunch
- type of location (for 2005 only) .

Definitions of NAEP reporting groups are available on the NAEP website (http://nces.ed.gov/nationsreportcard/science/results2005/interpret-results.asp#RepGroups).

Each of the variables is reported in tables that present the percentage of students belonging to each group in the first column and the average scale score in the second column. The columns to the right show the percentage of students below *Basic* and at or above each achievement level.

Differences between scores or percentages mentioned in the text are calculated using unrounded values. The result of subtracting the rounded values displayed in the tables may differ (usually by one point) from the results that would be obtained by subtracting the unrounded values.

The reader is cautioned against making causal inferences about the performance of groups of students relative to demographic variables. Many factors other than those discussed here, including home and school factors, may affect student performance.

NAEP collects information on many additional variables, including school and home factors related to achievement. All of this information is in an interactive database available on the NAEP website in the NAEP Data Explorer (http://nces.ed.gov/nationsreportcard/nde/).

Gender

Information on student gender is reported by the student's school when rosters of the students eligible to be assessed are submitted to NAEP.

Table 3 shows average scale scores and achievement-level data for public school students at grade 4 in South Dakota and the nation, by gender. In 2000 only, results were obtained for student samples for which accommodations were permitted and those for which accommodations were not permitted. However, in the text of this report, comparisons to 2000 results refer only to the sample for which accommodations were permitted.

Grade 4 Scale Score Results by Gender

- In 2005, male students in South Dakota had an average scale score in science (161) that was higher than that of male students in public schools across the nation (151). Similarly, female students in South Dakota had an average scale score (155) that was higher than that of female students across the nation (147).

Grade 4 Achievement-Level Results by Gender

- In the 2005 assessment, 40 percent of males and 30 percent of females performed at or above *Proficient* in South Dakota. The difference between these percentages was statistically significant.
- The percentage of males in South Dakota's public schools who performed at or above *Proficient* in 2005 (40 percent) was greater than that of males in the nation (30 percent).
- The percentage of females in South Dakota's public schools who performed at or above *Proficient* in 2005 (30 percent) was greater than that of females in the nation (24 percent).

Table 3

The Nation's Report Card 2005 State Assessment

Average science scale scores and percentage of students at or above each achievement level, by gender, grade 4 public schools: 2005

Gender		Percentage of students	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Male							
2005	Nation (public)	51	151*	32*	68*	30*	3
	South Dakota	51	161	18	82	40	3
Female							
2005	Nation (public)	49	147*	36*	64*	24*	2
	South Dakota	49	155	24	76	30	1

* Value is significantly different from the value for South Dakota.
NOTE: The NAEP grade 4 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scale: below *Basic*, 137 or lower; *Basic*, 138–169; *Proficient*, 170–204; and *Advanced*, 205 and above. All differences were tested for statistical significance at the .05 level using unrounded numbers. Detail may not sum to totals because of rounding. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Race/Ethnicity

Schools reported the racial/ethnic subgroup that best described the students eligible to be assessed. The six mutually exclusive categories are White, Black, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, and Unclassified. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Table 4 shows average scale scores and achievement-level data for public school students at grade 4 in South Dakota and the nation, by race/ethnicity. In 2000 only, results were obtained for student samples for which accommodations were permitted and those for which accommodations were not permitted. However, in the text of this report, comparisons to 2000 results refer only to the sample for which accommodations were permitted.

Grade 4 Scale Score Results by Race/Ethnicity

- In 2005, White students in South Dakota had an average scale score that was higher than that of American Indian/Alaska Native students.

Grade 4 Achievement-Level Results by Race/Ethnicity

- In South Dakota in 2005, the percentage of White students performing at or above *Proficient* was greater than that of American Indian/Alaska Native students.

Table 4

The Nation's Report Card 2005 State Assessment

Average science scale scores and percentage of students at or above each achievement level, by race/ethnicity, grade 4 public schools: 2005

Race/ethnicity		Percentage of students	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
White							
2005	Nation (public)	57*	161	18*	82*	38	3
	South Dakota	84	162	15	85	39	3
Black							
2005	Nation (public)	17*	128	62	38	7	#
	South Dakota	2	‡	‡	‡	‡	‡
Hispanic							
2005	Nation (public)	20*	132	56	44	10	#
	South Dakota	2	‡	‡	‡	‡	‡
Asian/Pacific Islander							
2005	Nation (public)	4*	156	26	74	34	5
	South Dakota	1	‡	‡	‡	‡	‡
American Indian/Alaska Native							
2005	Nation (public)	1*	139	47	53	15	1
	South Dakota	12	135	53	47	10	#
Unclassified[2]							
2005	Nation (public)	1	151	32	68	25	2
	South Dakota	#	‡	‡	‡	‡	‡

Estimate rounds to zero.
‡ Reporting standards are not met.
* Value is significantly different from the value for South Dakota.
[2] "Unclassified" students are those whose school-reported race was "other" or "unavailable," or was missing, and who self-reported more than one race category or none. The six mutually exclusive categories are White, Black, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, and Unclassified. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.
NOTE: The NAEP grade 4 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scale: below *Basic*, 137 or lower; *Basic*, 138–169; *Proficient*, 170–204; and *Advanced*, 205 and above. All differences were tested for statistical significance at the .05 level using unrounded numbers. Detail may not sum to totals because of rounding. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Student Eligibility for Free/Reduced-Price School Lunch

NAEP collects data on eligibility for the federal program providing free or reduced-price school lunches. The free/reduced-price lunch component of the National School Lunch Program (NSLP) offered through the U.S. Department of Agriculture (USDA) is designed to ensure that children near or below the poverty line receive nourishing meals. Eligibility is determined through the USDA's Income Eligibility Guidelines, and results for this category of students are included as an indicator of lower family income.

Table 5 shows average scale scores and achievement-level data for public school students at grade 4 in South Dakota and the nation, by eligibility for free/reduced-price lunch. In 2000 only, results were obtained for student samples for which accommodations were permitted and those for which accommodations were not permitted. However, in the text of this report, comparisons to 2000 results refer only to the sample for which accommodations were permitted.

Grade 4 Scale Score Results by Free/Reduced-Price Lunch Eligibility

- In 2005, students in South Dakota eligible for free/reduced-price lunch had an average science scale score of 148. This was lower than that of students in South Dakota not eligible for this program (165).
- Students in South Dakota eligible for free/reduced-price lunch had an average scale score (148) in 2005 that was higher than that of students in the nation who were eligible (135).

Grade 4 Achievement-Level Results by Free/Reduced-Price Lunch Eligibility

- In South Dakota in 2005, 22 percent of students who were eligible for free/reduced-price lunch and 43 percent of those who were not eligible for this program performed at or above *Proficient*. These percentages were found to be significantly different from one another.
- For students in South Dakota in 2005 who were eligible for free/reduced-price lunch, the percentage at or above *Proficient* (22 percent) was greater than the corresponding percentage for their counterparts around the nation (12 percent).

Table 5

The Nation's Report Card 2005 State Assessment

Average science scale scores and percentage of students at or above each achievement level, by eligibility for free/reduced-price school lunch, grade 4 public schools: 2005

Eligibility status		Percentage of students	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Eligible							
2005	Nation (public)	45*	135*	53*	47*	12*	#
	South Dakota	41	148	33	67	22	1
Not eligible							
2005	Nation (public)	53*	162*	18*	82*	40*	4
	South Dakota	58	165	12	88	43	3
Information not available							
2005	Nation (public)	2*	148	36	64	27	2
	South Dakota	#	‡	‡	‡	‡	‡

Estimate rounds to zero.
‡ Reporting standards are not met.
* Value is significantly different from the value for South Dakota.
NOTE: The NAEP grade 4 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scale: below *Basic*, 137 or lower; *Basic*, 138–169; *Proficient*, 170–204; and *Advanced*, 205 and above. All differences were tested for statistical significance at the .05 level using unrounded numbers. Detail may not sum to totals because of rounding. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Type of Location

Schools that participated in the assessment were classified as being located in three mutually exclusive types of community: central city, urban fringe/large town, and rural/small town. These categories indicate the geographic locations of schools. "Central city" is geographical term meaning the largest city of a Metropolitan Statistical Area and is not synonymous with "inner city." The criteria for classifying schools with respect to type of location changed for 2005; therefore, comparisons with prior years are not provided.

Table 6 shows average scale scores and achievement-level data for public school students at grade 4 in South Dakota and the nation, by type of location.

Grade 4 Scale Score Results by Type of Location

- In 2005, in South Dakota, the average scale score of students attending schools in central city locations was lower than that of students in rural schools, but was not found to be significantly different from that of students in urban fringe schools.
- In 2005, students attending public schools in central city locations in South Dakota had an average scale score (155) that was higher than the average scale score of students in central city locations in the nation (141).
- In 2005, students attending public schools in urban fringe locations in South Dakota had an average scale score (158) that was higher than the average scale score of students in urban fringe locations in the nation (153).
- In 2005, students attending public schools in rural locations in South Dakota had an average scale score (159) that was higher than the average scale score of students in rural locations in the nation (153).

Grade 4 Achievement-Level Results by Type of Location

- In 2005, the percentage of students in South Dakota's public schools in central city locations who performed at or above *Proficient* was not found to be significantly different from the corresponding percentages of students in urban fringe and rural schools.
- The percentage of students in South Dakota's public schools in central city locations who performed at or above *Proficient* (32) in 2005 was greater than that of students in central city locations in the nation (19).
- The percentage of students in South Dakota's public schools in urban fringe locations who performed at or above *Proficient* (33) in 2005 was not significantly different from that of students in urban fringe locations in the nation (31).
- The percentage of students in South Dakota's public schools in rural locations who performed at or above *Proficient* (36) in 2005 was greater than that of students in rural locations in the nation (30).

Table 6

The Nation's Report Card 2005 State Assessment

Average science scale scores and percentage of students at or above each achievement level, by type of location, grade 4 public schools: 2005

Type of location		Percentage of students	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Central city							
2005	Nation (public)	31*	141*	46*	54*	19*	2
	South Dakota	24	155	26	74	32	3
Urban fringe							
2005	Nation (public)	44*	153*	29*	71*	31	3
	South Dakota	9	158	18	82	33	2
Rural							
2005	Nation (public)	25*	153*	28*	72*	30*	2
	South Dakota	67	159	19	81	36	2

* Value is significantly different from the value for South Dakota.
NOTE: The NAEP grade 4 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scale: below *Basic*, 137 or lower; *Basic*, 138–169; *Proficient*, 170–204; and *Advanced*, 205 and above. All differences were tested for statistical significance at the .05 level using unrounded numbers. Detail may not sum to totals because of rounding. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Toward a More Inclusive NAEP: Students With Disabilities and English Language Learners

It is important to assess all students selected in the randomized sampling process, including students with disabilities (SD) and students who are classified by their schools as English language learners (ELL). Some students sampled for participation in NAEP can be excluded from the sample according to carefully defined criteria. School personnel, guided by the student's Individualized Education Program (IEP), as well as eligibility for Section 504 services, make decisions regarding inclusion of students with disabilities in the assessment. They also make decisions regarding inclusion of English language learners, based on NAEP's guidelines, by evaluating the student's capability of participating in the assessment given the available accommodations, and taking into consideration the number of years the student has been receiving instruction in English. The results displayed in this report and in other publications of the NAEP 2005 science results are based on representative samples that include SD and ELL students who were assessed either with or without accommodations, based on NAEP's guidelines.

Percentages of students excluded from NAEP may vary considerably across states, and, within a state, across years. Comparisons of results across states and within a state across years should be interpreted with caution if the exclusion rates vary widely. The percentages of assessed students classified as SD or ELL, as well as their NAEP performance in each participating state and jurisdiction, are available in an interactive database at the NAEP website (http://nces.ed.gov/nationsreportcard/nde/).

Prior to 2000, no testing accommodations were made available to the samples of students with disabilities and the English language learners in state NAEP science assessments that served as the basis for reported results. In the 1996 national and 2000 national and state science assessments, NAEP researchers drew a second representative sample of schools. Accommodations were made available for students in this sample who required them, provided the accommodation did not change the nature of what was tested. For example, students could be assessed one-on-one or in small groups, receive extended time, or use a large-print test book. In science, students had the option of having the test questions read aloud in English, an English-Spanish glossary (in 2000), or using a bilingual English-Spanish test book (in 2005). NAEP has used these comparable samples to study the effects of allowing accommodations for students categorized as SD or ELL in the assessments. A series of technical research papers covering various NAEP subject areas has been published with the results of these comparisons (see http://nces.ed.gov/nationsreportcard/about/inclusion.asp #research).

Table 7 displays the percentages of students with disabilities and English language learners in South Dakota identified, excluded, and assessed under standard and accommodated conditions at grade 4. The percentages in these tables are based on the total NAEP sample, including students who were excluded or not assessed.

Table 8 shows the percentage of students assessed in South Dakota by disability status and their performance on the NAEP assessment in terms of average scale scores and percentages performing below *Basic*, at or above *Basic*, at or above *Proficient*, and at *Advanced* for grade 4. The denominator for the percentages in these tables is the total number of students assessed.

Table 9 presents the percentage of students assessed in South Dakota by ELL status, their average scale scores, and their performance in terms of the percentage below *Basic*, the percentages at or above *Basic*, at or above *Proficient*, and at *Advanced*.

Table 10 presents the total number of students assessed, the percentage of students sampled who were excluded, and average scale scores for all participating states and other jurisdictions.

Table 7

The Nation's Report Card 2005 State Assessment

Percentage of all students in science assessments identified as SD and ELL, excluded, and assessed, grade 4 public schools: 2005

Year and testing status	SD and/or ELL		SD		ELL	
	South Dakota	Nation	South Dakota	Nation	South Dakota	Nation
2005 Identified	17	22	14	14	3	10
Excluded	1	3	1	3	#	1
Assessed under standard conditions	7	9	6	4	2	6
Assessed with accommodations	9	10	8	7	1	3

Estimate rounds to zero.
NOTE: SD = students with disabilities. ELL = English language learners. Detail may not sum to totals because of rounding. Some students were identified as both SD and ELL. Such students would be included in both the SD and ELL portions of the table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Table 8

The Nation's Report Card 2005 State Assessment

Average science scale scores and percentage of students at or above each achievement level, by students' disability status, grade 4 public schools: 2005

Student disability status		Percentage of students	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Yes							
2005	Nation (public)	11*	133*	55*	45*	13	1
	South Dakota	14	139	45	55	14	#
No							
2005	Nation (public)	89*	151*	31*	69*	29*	2
	South Dakota	86	161	17	83	38	2

Estimate rounds to zero.
* Value is significantly different from the value for South Dakota.
NOTE: The NAEP grade 4 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scale: below *Basic*, 137 or lower; *Basic*, 138–169; *Proficient*, 170–204; and *Advanced*, 205 and above. All differences were tested for statistical significance at the .05 level using unrounded numbers. Detail may not sum to totals because of rounding. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Table 9

The Nation's Report Card 2005 State Assessment

Average science scale scores and percentage of students at or above each achievement level, by students' classification as English language learners (ELL), grade 4 public schools: 2005

ELL status		Percentage of students	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Yes							
2005	Nation (public)	9*	120	72	28	4	#
	South Dakota	3	116	78	22	3	#
No							
2005	Nation (public)	91*	152*	30*	70*	29*	3
	South Dakota	97	159	19	81	36	2

Estimate rounds to zero.
* Value is significantly different from the value for South Dakota.
NOTE: The NAEP grade 4 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scale: below *Basic*, 137 or lower; *Basic*, 138–169; *Proficient*, 170–204; and *Advanced*, 205 and above. All differences were tested for statistical significance at the .05 level using unrounded numbers. Detail may not sum to totals because of rounding. Performance comparisons may be affected by differences in exclusion rates for students with disabilities and English language learners in the NAEP samples and by changes in sample sizes.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Table 10

The Nation's Report Card 2005 State Assessment

Total number of students assessed, percentage of all students who were excluded, and average science scale scores, grade 4public schools: By state, 2005

State/jurisdiction	Grade 4		
	Number assessed	Percentage excluded	Average scale score
Alabama	2,600	2	142
Arizona	2,800	5	139
Arkansas	2,800	3	147
California	10,600	4	137
Colorado	2,700	3	155
Connecticut	2,800	3	155
Delaware	2,600	5	152
Florida	4,400	3	150
Georgia	4,200	2	148
Hawaii	2,800	3	142
Idaho	2,900	2	155
Illinois	4,100	3	148
Indiana	2,700	2	152
Kentucky	2,800	2	158
Louisiana	2,700	2	143
Maine	2,600	3	160
Maryland	2,800	2	149
Massachusetts	3,900	4	160
Michigan	2,500	4	152
Minnesota	2,600	2	156
Mississippi	2,800	3	133
Missouri	2,700	3	158
Montana	2,700	2	160
Nevada	2,900	4	140
New Hampshire	2,600	2	161
New Jersey	2,800	3	154
New Mexico	2,800	3	141
North Carolina	4,100	3	149
North Dakota	2,200	3	160
Ohio	3,500	4	157
Oklahoma	2,700	4	150
Oregon	2,700	4	151
Rhode Island	2,700	3	146
South Carolina	2,800	4	148
South Dakota	2,800	1	158
Tennessee	2,800	3	150
Texas	8,300	7	150
Utah	2,900	3	155
Vermont	2,000	3	160
Virginia	2,800	3	161
Washington	2,800	3	153
West Virginia	2,700	2	151
Wisconsin	2,600	3	158
Wyoming	1,800	2	157
Other jurisdiction			
DoDEA[1]	2,400	2	156

[1] Department of Defense Education Activity schools (domestic and overseas).

NOTE: The NAEP grade 4 science scale ranges from 0 to 300. Sample sizes are rounded to the nearest hundred.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Science Assessment.

Where to Find More Information

The NAEP Science Assessment
The latest news about the NAEP 2005 science assessment and the national results can be found on the NAEP website at http://nces.ed.gov/nationsreportcard/science/results/. The individual snapshot reports for each participating state and other jurisdictions are also available in the state results section of the website at http://nces.ed.gov/nationsreportcard/states/.

The Nation's Report Card: Science 2005 may be ordered or downloaded at the NAEP website.

The *Science Framework for the 2005 National Assessment of Educational Progress*, on which this assessment is based, is available at the National Assessment Governing Board website (http://www.nagb.org/pubs/s_framework_05/761907-ScienceFramework.pdf).

Additional Results from the Science Assessment
For more findings from the 2005 science assessments, refer to the NAEP 2005 results at http://nces.ed.gov/nationsreportcard/nde/. The interactive database at this site includes student, teacher, and school variables for all participating states and other jurisdictions, the nation, and the four regions. Data tables are also available for each jurisdiction, with all background questions cross-tabulated with the major demographic variables. Users can design and create tables and can perform tests of statistical significance at this website.

Technical Documentation
For explanations of NAEP's general survey procedures, see: Allen, N.L., Donoghue, J.R., and Schoeps, T.L. (2001). *The NAEP 1998 Technical Report*. (NCES 2001–509). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics. Technical information for NAEP assessments may also be found on the NAEP website at (http://nces.ed.gov/nationsreportcard/science/results2003/interpret-results.asp).

Publications on the inclusion of students with disabilities and limited-English-proficient students
Olson, J.F., and Goldstein, A.A. (1997). *The Inclusion of Students With Disabilities and Limited-English-Proficient Students in Large-Scale Assessments: A Summary of Recent Progress* (NCES 97–482). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics.

Mazzeo, J., Carlson, J.E., Voelkl, K.E., and Lutkus, A.D. (2000). *Increasing the Participation of Special-Needs Students in NAEP: A Report on 1996 Research Activities* (NCES 2000–473). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics.

Lutkus, A.D., and Mazzeo, J. (2003). *Including Special-Needs Students in the NAEP 1998 Reading Assessment, Part I: Comparison of Overall Results With and Without Accommodations* (NCES 2003–467). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.

Lutkus, A.D. (2004). *Including Special-Needs Students in the NAEP 1998 Reading Assessment, Part II: Results for Students With Disabilities and Limited-English-Proficient Students* (ETS-NAEP 04-R01). Princeton, NJ: Educational Testing Service.

To Order Publications
Recent NAEP publications related to science are listed on the science page of the NAEP website and are available electronically. Publications can also be ordered from:

Education Publications Center (ED Pubs)
U.S. Department of Education
P.O. Box 1398
Jessup, MD 20794–1398

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FAX: 1-301-470-1244

The NAEP State Report Generator was developed for the NAEP 2005 reports by Phillip Leung, Anthony Lutkus, Paul Gazzillo, Mike Narcowich, Nancy Mead, Linda Myers, Mary Daane, and Bobby Rampey.

What is the Nation's Report Card?

The Nation's Report Card informs the public about the academic achievement of elementary and secondary students in the United States. Report cards communicate the findings of the National Assessment of Educational Progress (NAEP), the only continuing and nationally representative measure of achievement in various subjects over time. *The Nation's Report Card* compares performance among states, urban districts, public and private schools, and student demographic groups.

For over three decades, NAEP assessments have been conducted periodically in reading, mathematics, science, writing, history, geography, and other subjects. By making objective information available on student performance at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement and relevant variables is collected. The privacy of individual students is protected, and the identities of participating schools are not released.

NAEP is a congressionally mandated project of the National Center for Education Statistics within the Institute of Education Sciences of the U.S. Department of Education. By law, the Commissioner of Education Statistics is responsible for carrying out the NAEP project. The National Assessment Governing Board (NAGB) oversees and sets policy for NAEP. NAGB is an independent, bipartisan group whose members include governors, state legislators, local and state officials, educators, business representatives and members of the general public. NAGB's mission is, "to ensure equal access to education and to promote educational excellence throughout the nation."

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